

Core Imaging Techniques

Contact person: Dan Olsen

E-mail: do@geus.dk

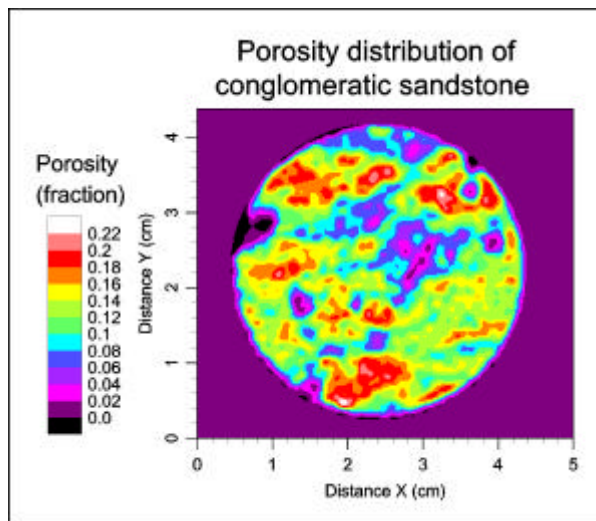


Core Imaging

GEUS has access to state-of-the-art X-ray CT and NMR scanners. The imaging capabilities of these instruments combined with a range of Core Analysis techniques are used for determination of petrophysical parameters on core samples, e.g. porosity distributions, fluid saturation distributions, capillary pressure functions, and relative permeability functions. Imaging may be performed during flooding experiments in custom-made core holders.

X-ray CT Imaging

X-ray CT (Computed Tomography) imaging is performed with a Siemens AR.SP scanner situated at Amager Hospital in Copenhagen. The instrument produces images at a maximum speed of 1 image every 15 seconds. Nominal resolution typically is 0.2 mm in the image plane at a slice thickness of 2 mm. Applications include qualitative sample screening, and quantitative porosity mapping and fluid saturation mapping. Nearly all rock types are suitable for X-ray CT imaging. The figure at the lower left shows an example of a quantitative porosity map produced by X-ray CT imaging.



NMR Imaging

NMR (Nuclear Magnetic Resonance) imaging is performed with a 4.7 T SISCO scanner situated at Danish Research Centre of Magnetic Resonance in Copenhagen. It is an experimental scanner with an actively shielded gradient set capable of producing gradients up to 140 mT/m. The instrument is used for NMR spectroscopy, relaxation measurements, Chemical Shift Imaging, and Spin Echo Imaging on suitable rock samples. Quantitative imaging may be performed in 1D or 2D. Only rock types with low contents of paramagnetic and ferromagnetic minerals are suitable for NMR imaging. Limestone, chalk and clean sandstone commonly fulfil this requirement. The figure to the lower right shows an example of a set of quantitative 1D fluid saturation profiles produced by NMR imaging during displacement experiments on a chalk core sample.

